

**WHAT IS CLAIMED IS:**

1. A micro-fluid ejection device, comprising:
  - a fluid ejection chip having a first length and a first width and having a first side and a second side, the first side including a plurality of fluid ejection actuators and a plurality of bond pads;
  - 5        a flexible circuit having a first side and a second side, a window therein, and leads disposed in the window, wherein the window of the flexible circuit circumscribes the chip and each of the leads is electrically connected to corresponding bond pads on the first side of the chip; and
  - 10        a nozzle plate structure containing a plurality of nozzle holes therein, the nozzle plate structure having a second length and a second width and being attached to the flexible circuit and chip, wherein the nozzle plate structure overlaps the first side of the chip and at least the leads and bond pads, wherein the nozzle plate structure is effective to retard fluid contact with the bond pads and leads in the absence of an encapsulant.
2. The device of claim 1, wherein the nozzle plate structure comprises a polyimide film.
- 15        3. The device of claim 1, wherein the nozzle plate structure comprises a nozzle plate and a protection plate circumscribing the nozzle plate.
4. The device of claim 3, wherein the protection plate comprises a polyamide material.
5. The device of claim 3, wherein the second width is greater than the first width.
- 20        6. The device of claim 5, wherein the second length is greater than the first length.

7. The device of claim 3, wherein the protection plate overlaps the first side of the chip and the leads and bond pads.

8. A printhead comprising the fluid ejection device of claim 1.

9. A printhead comprising the fluid ejection device of claim 3.

10. The printhead of claim 9, wherein the nozzle plate comprises a polyimide material.

11. A method for making a printhead for an inkjet printer, comprising the steps of :

5        providing a fluid ejection chip having a first length and a first width and having a first side and a second side, the first side including a plurality of fluid ejection actuators and a plurality of bond pads;

      providing a flexible circuit having a first side and a second side, a window therein, and leads disposed in the window, wherein the window of the flexible circuit  
10       is sized to circumscribe the chip;

      providing a nozzle plate containing a plurality of nozzle holes therein, the nozzle plate being dimensioned slightly smaller than the chip;

      attaching the nozzle plate to the chip to provide a nozzle plate/chip assembly;

      attaching the nozzle plate/chip assembly to the TAB circuit, wherein each of  
15       the leads is electrically connected by a TAB bonding process to corresponding bond pads on the first side of the chip;

      providing a secondary plate having a window sized to closely circumscribe the nozzle plate;

      attaching the secondary plate to the first side of the flexible circuit such that  
20       the secondary plate overlaps the first side of the chip and at least the leads and bond pads and is effective to retard fluid contact with the bond pads and leads in the absence of an encapsulant.

12. The method of claim 11, wherein the secondary plate is made of a polyimide film.

13. A method for making a micro-fluid ejection head for a micro-fluid  
5 ejection device, comprising the steps of:

providing a semiconductor substrate containing fluid ejection devices electrically connected to contact pads on a surface thereof and having a TAB circuit including lead beams electrically connected to the contact pads on the semiconductor substrate surface, providing a nozzle plate structure, and installing the nozzle plate  
10 structure relative to the TAB circuit so as to substantially cover the lead beams and contact pads to protect the lead beams and contact pads from exposure to fluid ejected by the micro-fluid ejection device.

14. The method of claim 13, wherein the nozzle plate structure comprises a  
15 nozzle plate portion and a protection plate portion extending from the nozzle plate portion.

15. The method of claim 13 wherein the nozzle plate structure comprises a nozzle plate and a separate protection plate, wherein the protection plate closely  
20 circumscribes the nozzle plate.

16. The method of claim 13, wherein the nozzle plate structure comprises a polyimide film.